NASA - Jet Propulsion Laboratory

SUPERFUND PROJECT

February 12, 1997

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Manager, Environmental Affairs Office

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PRESENTATION AGENDA

1. HISTORY LEADING TO THE SUPERFUND PROJECT

2. THE SUPERFUND PROCESS

3. TECHNICAL APPROACH TO THE PROJECT

4. TECHNICAL INFORMATION AVAILABLE TO DATE AND INTERPRETATION

5. REMEDIAL ACTION POSSIBILITIES AND THEIR ASSOCIATED ISSUES

6. ~~POTENTIAL COST CONSIDERATIONS~~

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OVERVIEW OF SUPERFUND KEY EVENTS

1980	CITY OF PASADENA WELLS SHOW VOC CONTAMINATION BELOW MCLS
1988	NASA/JPL COMPLETES PA/SI AS REQUIRED BY SARA
1990	EXPANDED SITE INSPECTION IS COMPLETED
	- 7 WELLS INSTALLED
	- SEEPAGE PITS IDENTIFIED AS POSSIBLE CONTAMINANT SOURCE
10/14/92	JPL LISTED ON NPL
12/23/92	FEDERAL FACILITIES AGREEMENT SIGNED
12/92	WELLS #8 THROUGH #11 COMPLETED
06/93	FIRST SERIES OF DOCUMENTS DUE TO AGENCIES

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DEVELOPMENT OF THE SITE HISTORY

APPROACH:

- JPL RECORDS WERE EXHAUSTIVELY RESEARCHED FOR POSSIBLE CLUES REGARDING SOURCES OF CONTAMINATION
  - JPL ARCHIVES
  - FACILITIES DRAWINGS DATING BACK TO THE 1940s
  - SITE PHOTOGRAPHS
- MANY CURRENT AND FORMER EMPLOYEES ALSO INTERVIEWED TO DETERMINE THE OPERATIONS AND THE LOCATIONS OF CONTAMINATION

RESULTS:

- 41 POSSIBLE LOCATIONS WERE IDENTIFIED AND EVALUATED FOR THEIR POTENTIAL TO CONTRIBUTE TO THE CONTAMINATION FOUND IN THE GROUND WATER UNDER AND SURROUNDING JPL
- MOST WERE AREAS OR FACILITIES THAT USED CHEMICALS AND THEN DUMPED THEM INTO SEEPAGE PUTS OR DRY WELLS
  - SOME WERE OPEN DISPOSAL AREAS, STORM DRAINS AND OTHER SIMILAR SITES
- OTHER AREAS BECAME KNOWN DURING THE COURSE OF TIME (e.g. O.I.L. BUILDING)

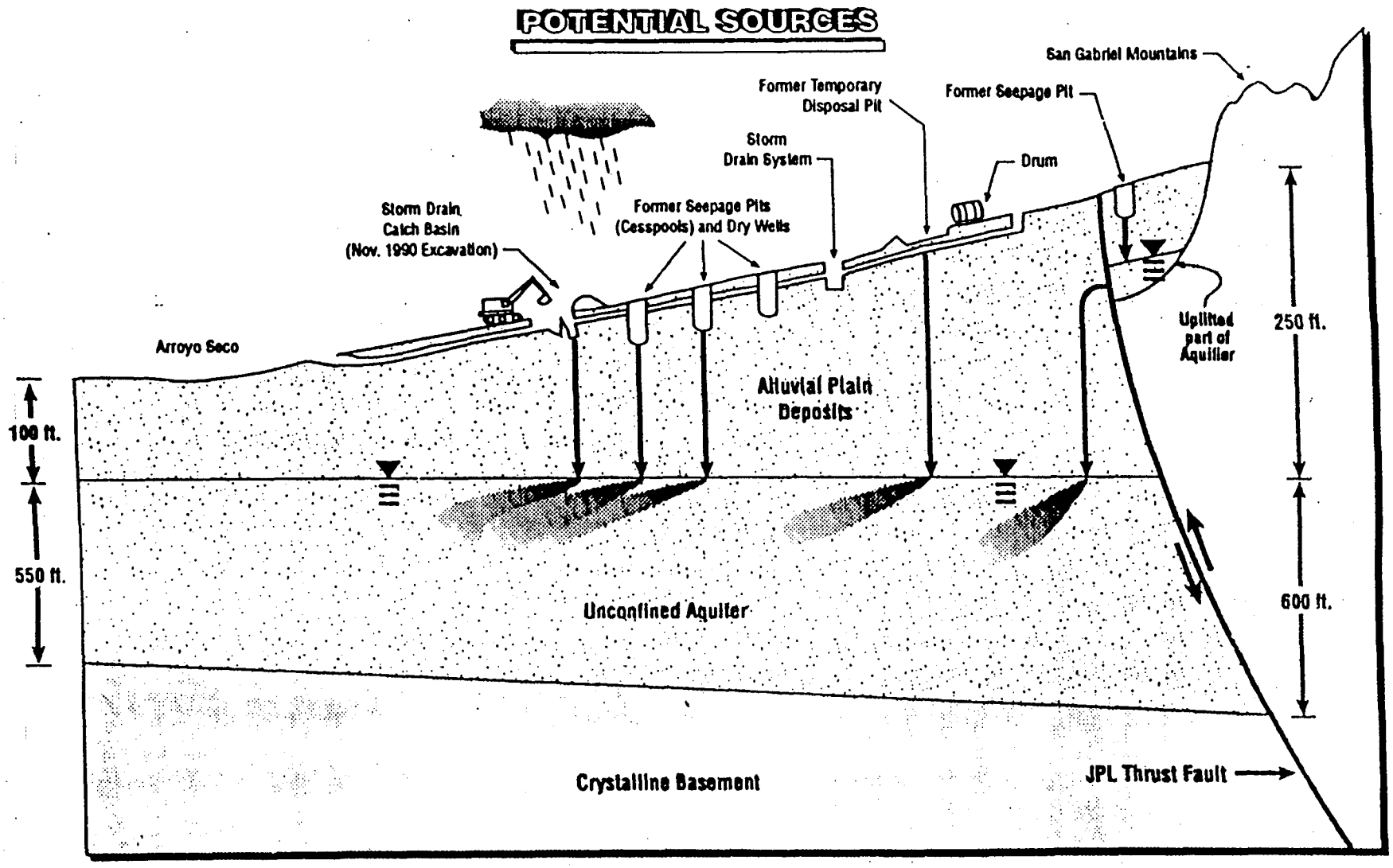

Figure 3 - 2

Conceptual Cross-Section Through the Jet Propulsion Laboratory

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THE SUPERFUND PROCESS

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WHAT IS SUPERFUND?

- ESTABLISHED BY CONGRESS IN 1980
- OFFICIALLY KNOWN AS THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA)
- REAUTHORIZED IN 1986 BY THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA)
- ALLOWS THE FEDERAL GOVERNMENT TO RESPOND DIRECTLY TO RELEASES, OR THREATENED RELEASES, OF HAZARDOUS SUBSTANCES THAT MAY ENDANGER PUBLIC HEALTH OR THE ENVIRONMENT
- SUPERFUND IS ACTUALLY A TRUST FUND
  - FUNDED BY TAXES
  - USED WHEN RESPONSIBLE PARTIES CANNOT BE FOUND, ARE UNABLE OR UNWILLING, TO PAY FOR CLEANUP
- SUPERFUND LAW ALLOWS FOR LEGAL ACTIONS AGAINST RESPONSIBLE PARTIES TO RECOVER SUPERFUND MONIES
  - SUBSTANTIAL PENALTIES CAN ALSO BE IMPOSED

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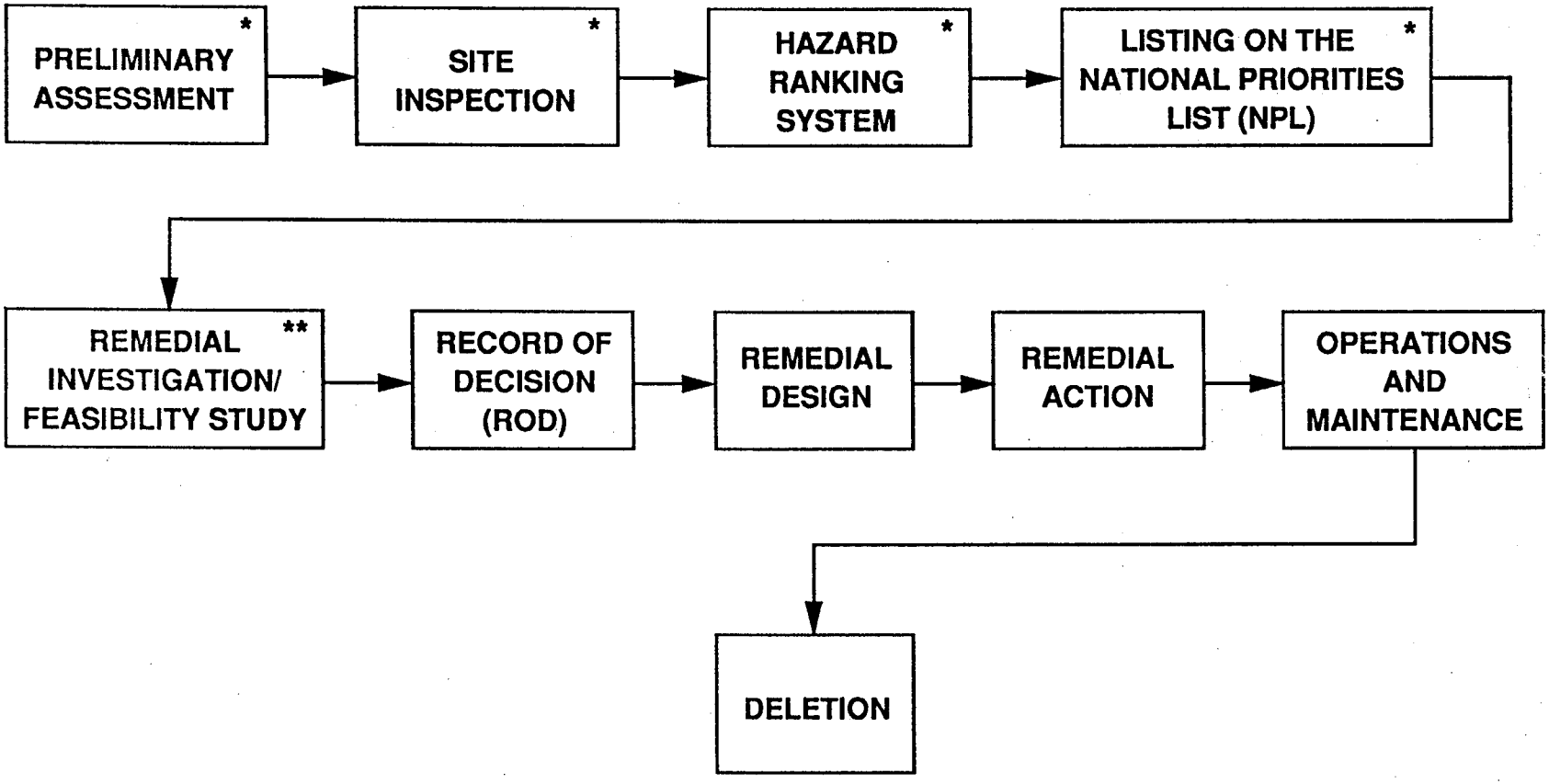
THE SUPERFUND PROCESS



* COMPLETED
** IN PROCESS

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Superfund Process Chart

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FEDERAL FACILITIES AGREEMENT (FFA)

- EPA CANNOT "FORCE" NASA TO RESPOND TO CERCLA
  - AGREEMENT BETWEEN FEDERAL AGENCIES IS NEEDED
- FFA IDENTIFIES THE INTER-RELATIONSHIP OF THE REGULATORY AGENCIES AND NASA
  - AGENCIES INCLUDE EPA, STATE DEPARTMENT OF TOXIC SUBSTANCES CONTROL (DTSC) AND THE REGIONAL WATER QUALITY CONTROL BOARD (RWQCB)
- ESTABLISHES SCHEDULES, PENALTIES, REVIEW TIMES AND STATE REIMBURSEMENT
- SINCE NASA, NOT JPL, IS A SIGNATORY TO THE FFA, JPL NMO LED THE NEGOTIATIONS WITH JPL-EAO SUPPORT
  - NASA HQ (CODE JE) ALSO HEAVILY INVOLVED
- FFA WAS SIGNED IN DECEMBER 1992

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JPL/NASA INTERACTIONS

- JPL PROVIDED TEMPORARY PROJECT MANAGER UNTIL NASA-NMO HIRED PROJECT MANAGER

- JPL ACTS IN SUPPORT ROLE TO NASA
  - NASA IS LEAD ON ALL NEGOTIATIONS WITH AGENCIES
  - SEPARATE TASK ORDER (TO JPL'S CONTRACT) TASKS JPL TO SUPPORT NASA

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TECHNICAL APPROACH TO THE PROJECT

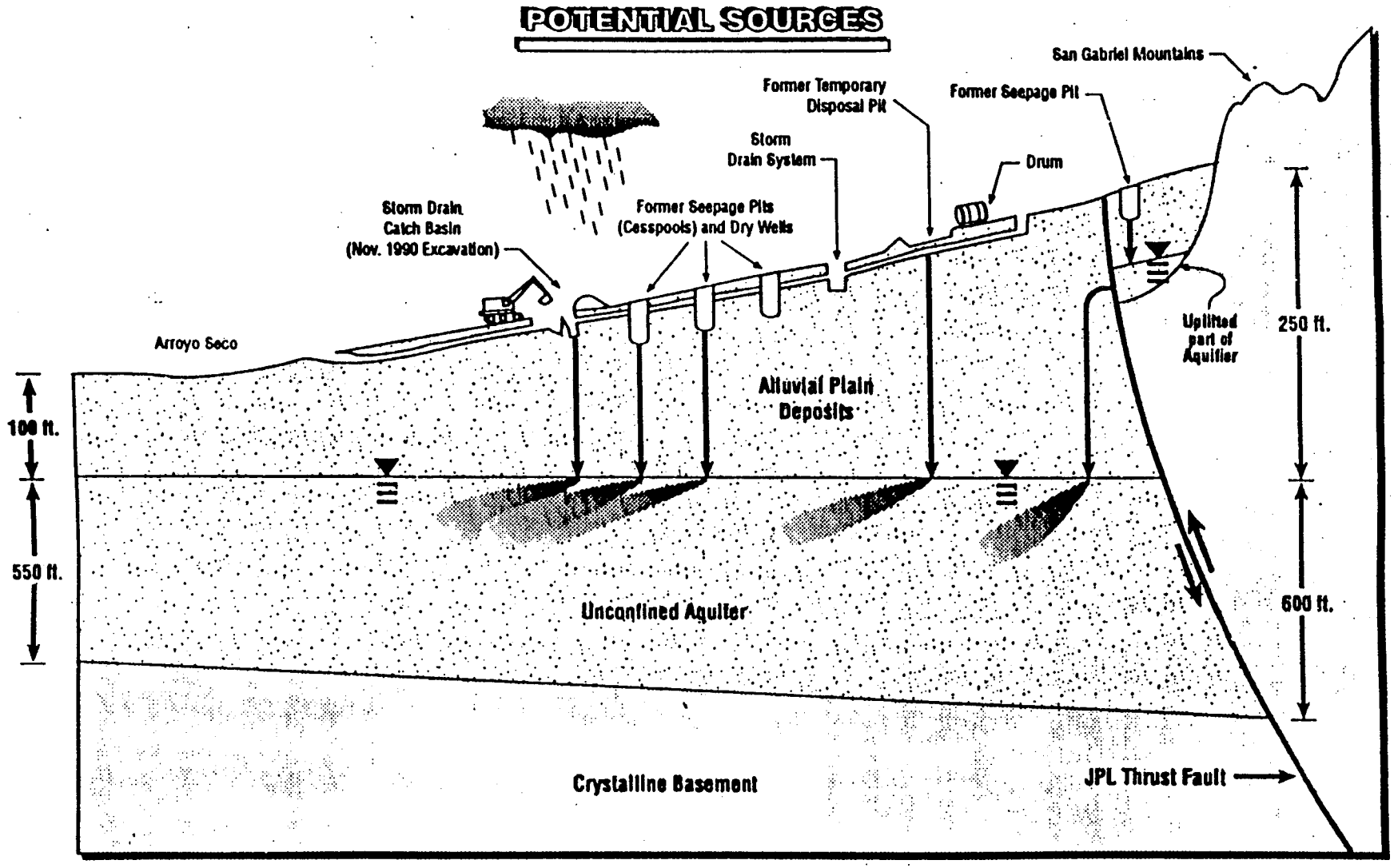

Figure 3 - 2

Conceptual Cross-Section Through the Jet Propulsion Laboratory

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FIGURE 3-2 Conceptual Cross-Section Through the Jet Propulsion Laboratory

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JPL CERCLA PROJECT "OPERABLE UNITS"

- **OPERABLE UNIT: A PORTION OF A GIVEN PROJECT THAT CAN BE DEALT WITH AS A DISCRETE UNIT OF THE ENTIRE SITE**

- **JPL HAS BEEN BROKEN DOWN INTO THREE (3) OPERABLE UNITS (OU)**
  - **OU-1: ON-SITE GROUNDWATER**
  - **OU-2: ON-SITE SOURCES (PITS, CESSPOOLS)**
  - **OU-3: OFF-SITE GROUNDWATER**

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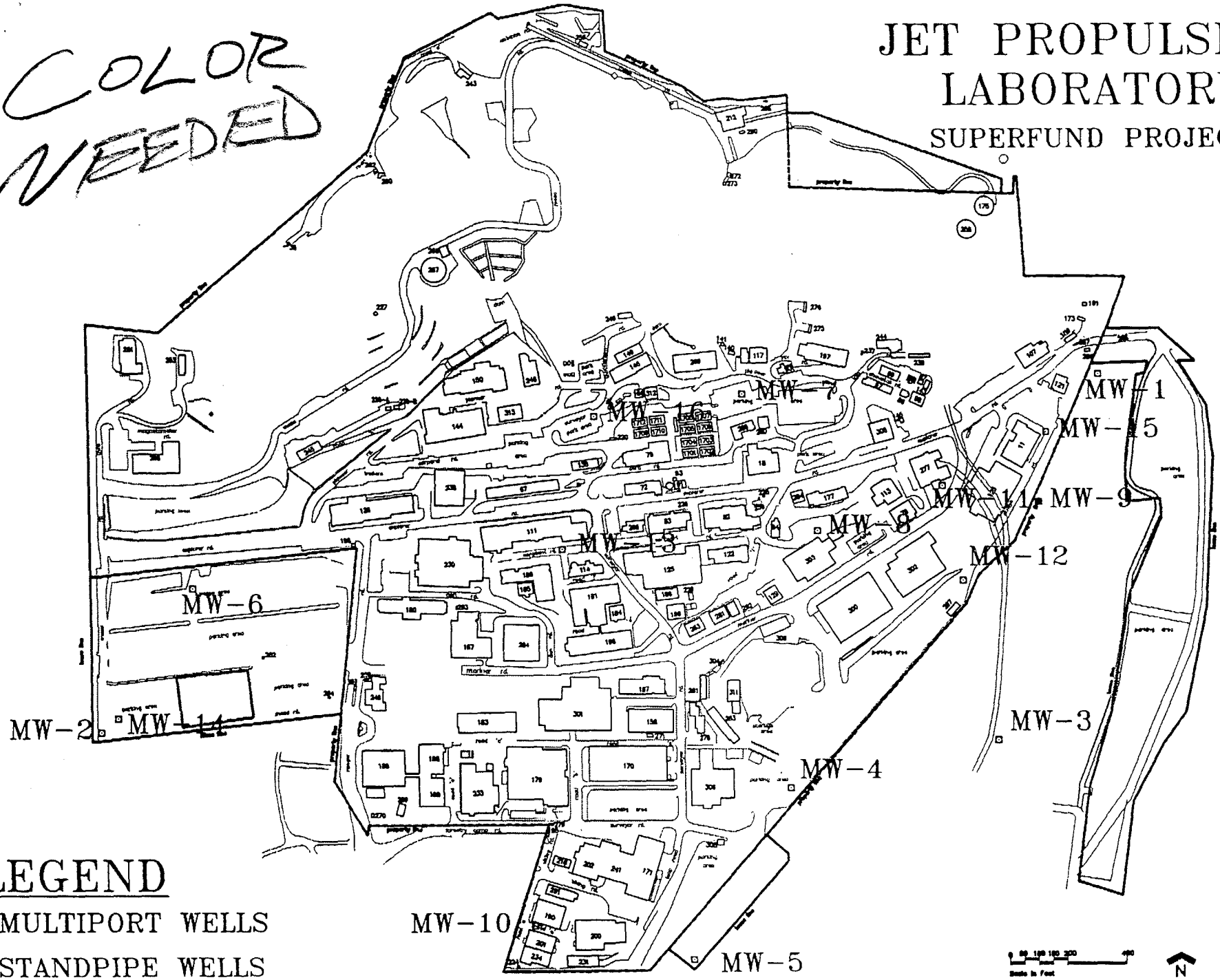
OPERABLE UNIT #1 INITIAL APPROACH

- INSTALL A TOTAL OF 16 GROUNDWATER MONITORING WELLS ON-SITE AND IN THE ARROYO
- SAMPLE ALL WELLS IN WET AND DRY SEASONS FOR CONTAMINANTS
  - VOCs AND OTHERS
- DEVELOP 3-D UNDERSTANDING OF CONTAMINANT DISTRIBUTION
  - SUPPLEMENT WITH COMPUTER MODELING
- EVALUATE ALTERNATIVES FOR REMEDIAL ACTION NEEDED (IF ANY)

COLOR NEEDED

JET PROPULSION LABORATORY

SUPERFUND PROJECT



LEGEND

- ▫ MULTIPORT WELLS
- ▫ STANDPIPE WELLS

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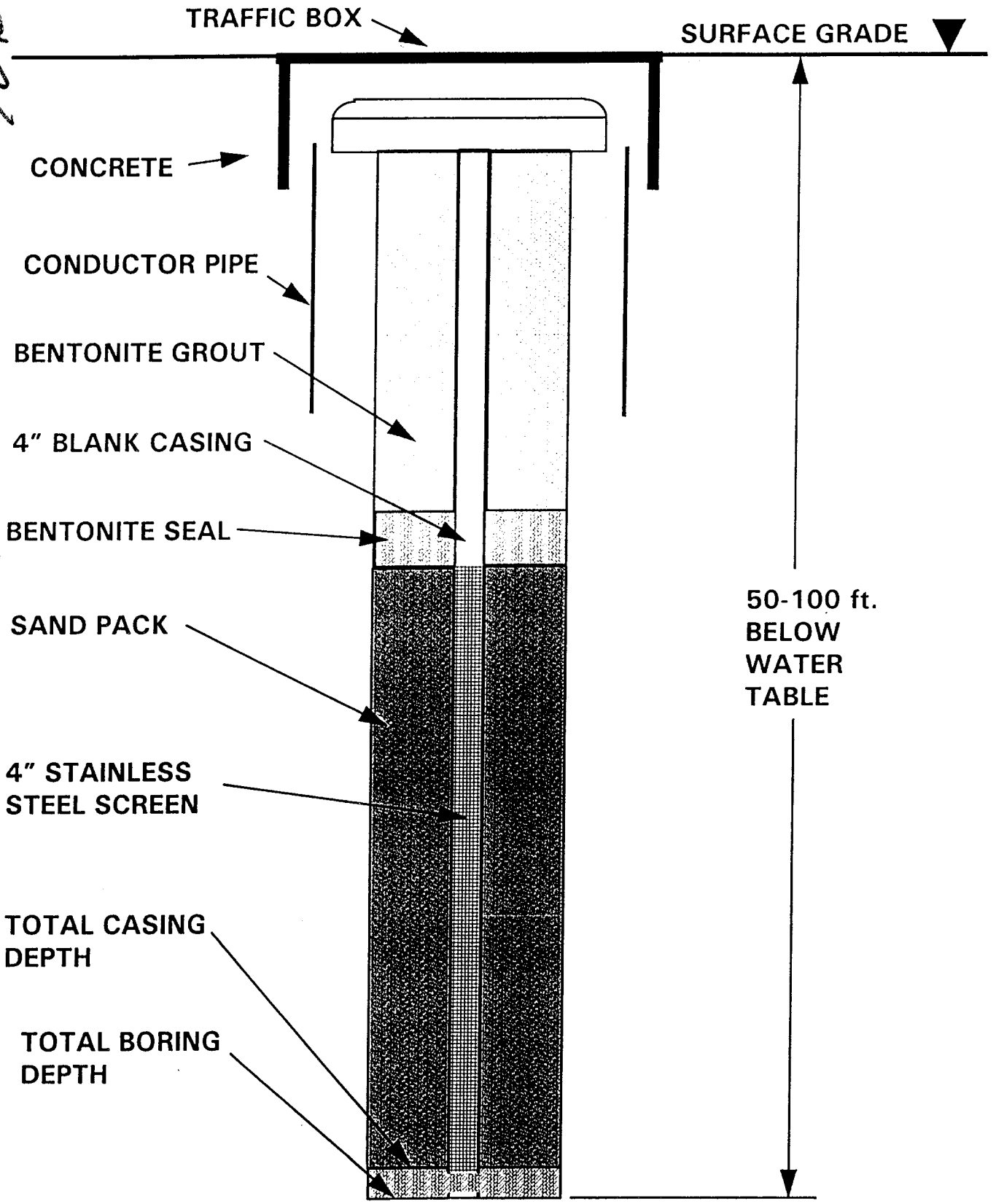
JPL SUPERFUND PROJECT MAP

COLOR NEEDED

JPL STANDPIPE WELL CONSTRUCTION



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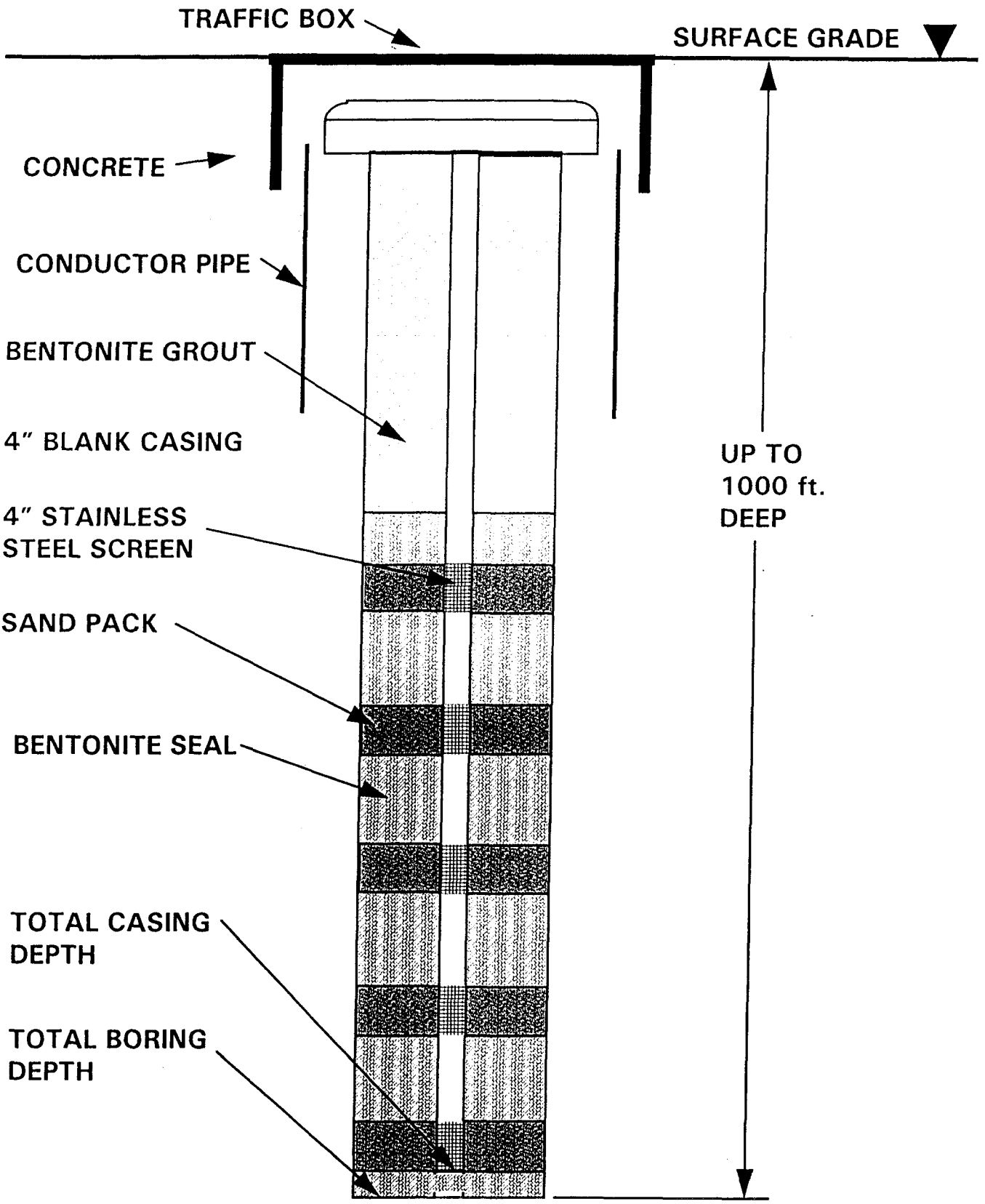
JPL STANDPIPE WELL CONSTRUCTION

COLOR NEEDED

JPL MULTIPORT WELL CONSTRUCTION



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JPL MULTIPORT WELL CONSTRUCTION

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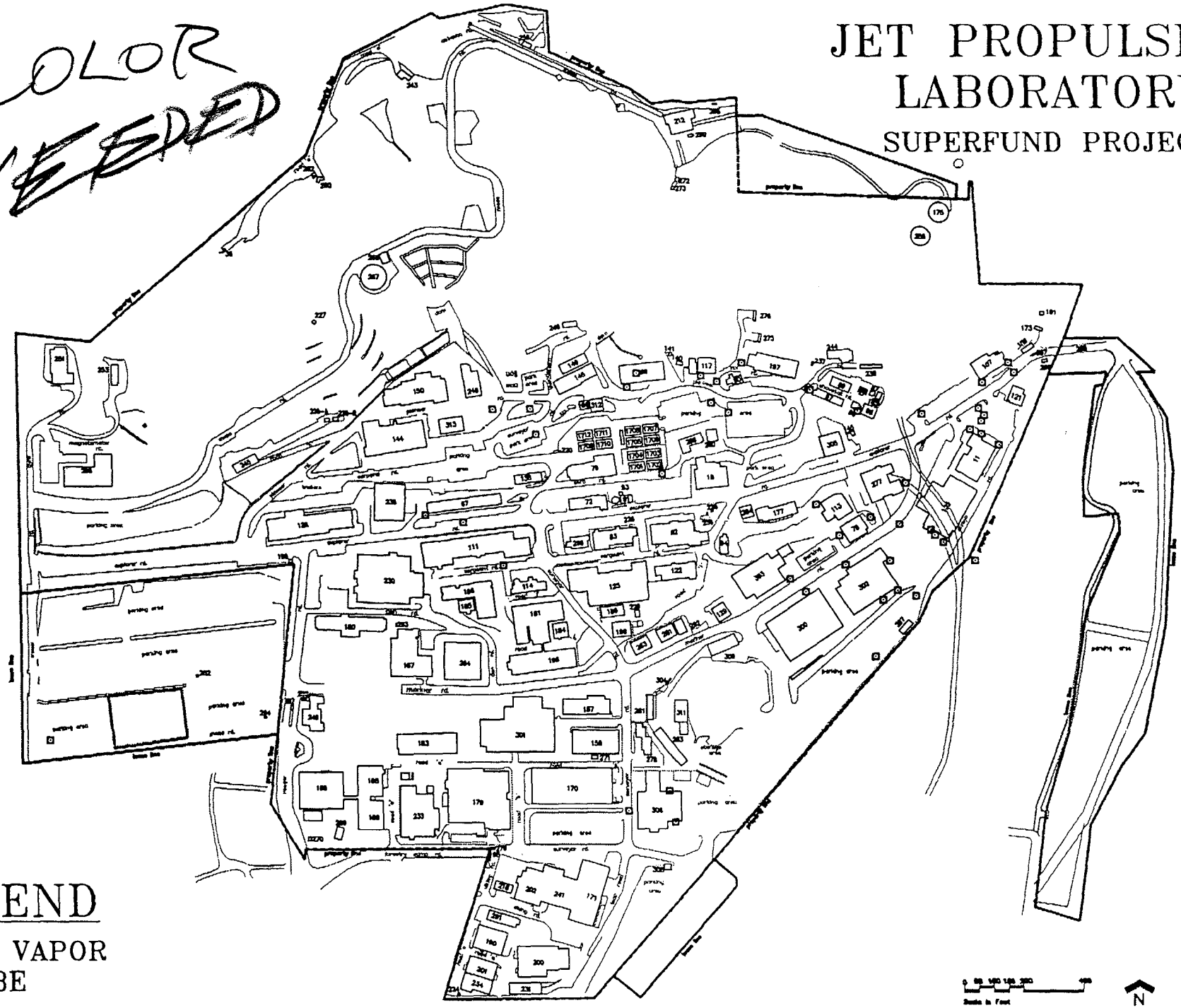
OPERABLE UNIT #2 INITIAL APPROACH

- PERFORM SOIL VAPOR ANALYSES AT IDENTIFIED SEEPAGE PIT LOCATIONS
  - ANALYZE FOR VOCs
- SAMPLE SOIL AT 24 LOCATIONS FOR NON-VOLATILE CONTAMINATION (METALS, etc.)
- INSTALL NESTED SOIL VAPOR WELLS AT THE SOIL SAMPLE LOCATIONS
  - HELPS TO DETERMINE VERTICAL DISTRIBUTION OF SOIL VAPORS
- DEVELOP 3-D UNDERSTANDING OF SOIL VAPOR AND SOIL CONTAMINATION
- EVALUATE REMEDIAL ALTERNATIVES REQUIRED (IF ANY)

COLOR NEEDED

JET PROPULSION LABORATORY

SUPERFUND PROJECT



LEGEND

- SOIL VAPOR PROBE

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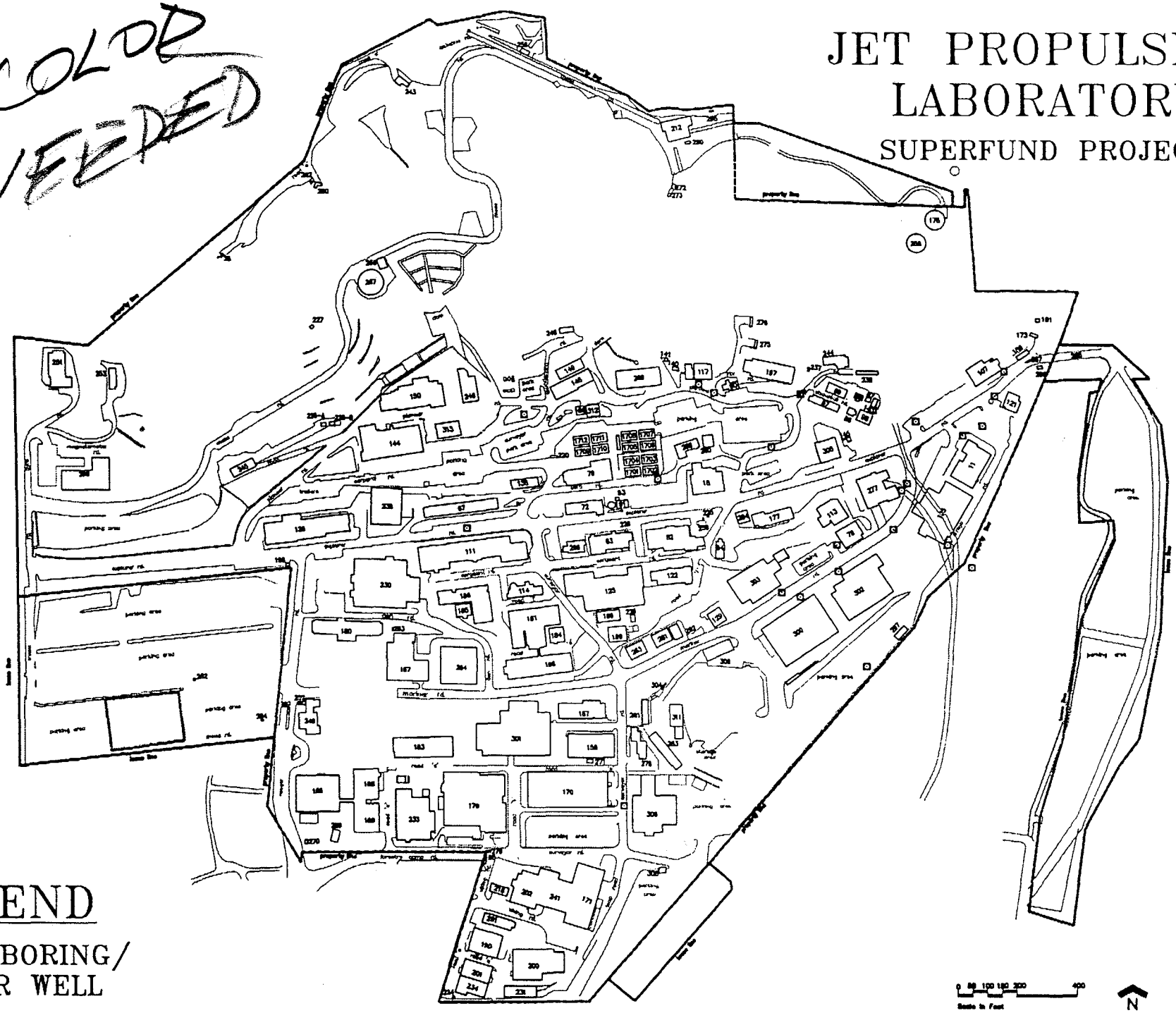
JPL SUPERFUND PROJECT MAP Soil Vapor

COLOR NEEDED

JET PROPULSION LABORATORY

SUPERFUND PROJECT



LEGEND

- SOIL BORING/ VAPOR WELL

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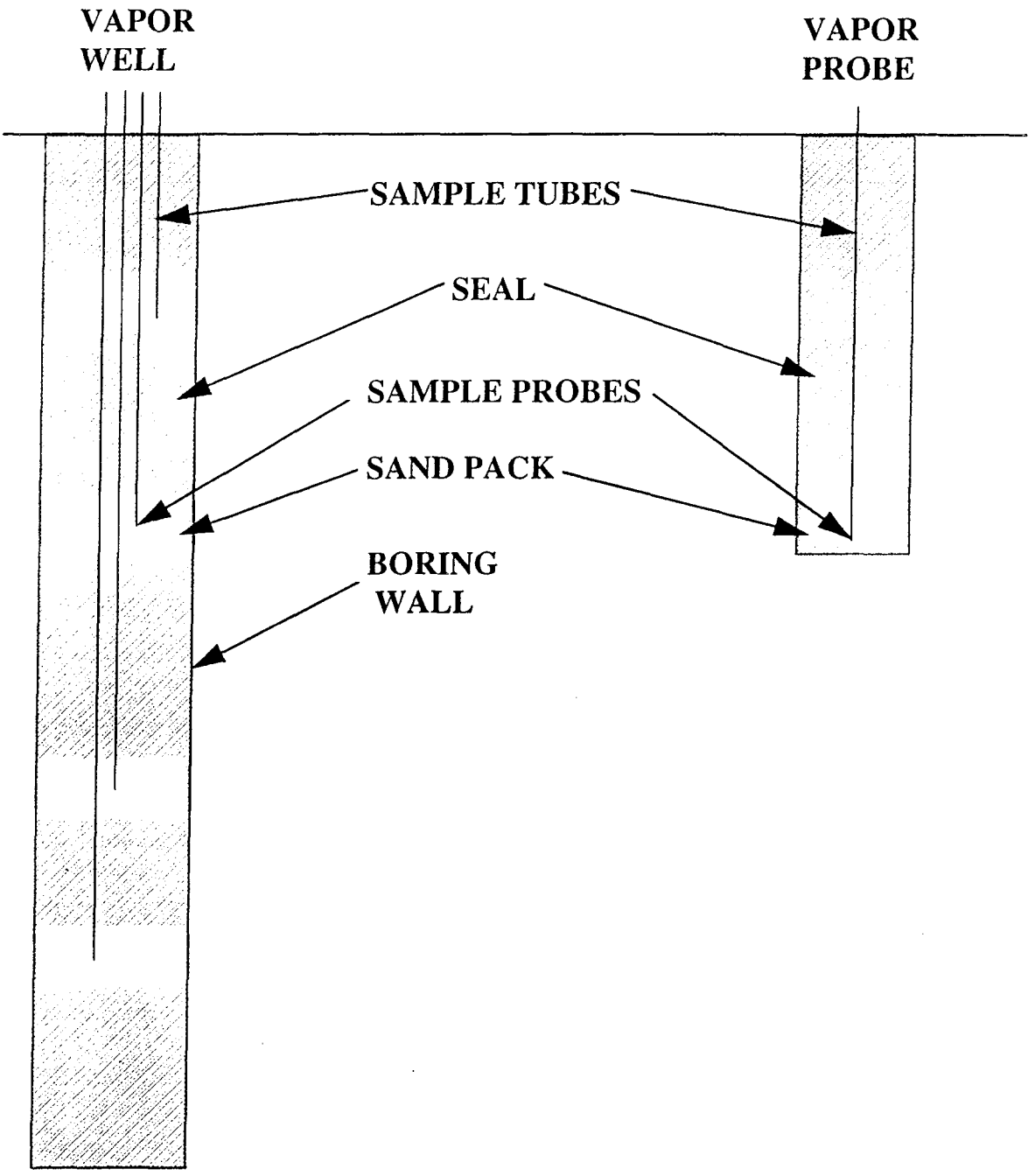
JPL SUPERFUND PROJECT MAP

Sand Bowl / Vapor Well

SOIL PROBE AND SOIL VAPOR WELL CONSTRUCTION

COLOR NEEDED



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SOIL PROBE AND SOIL VAPOR WELL CONSTRUCTION

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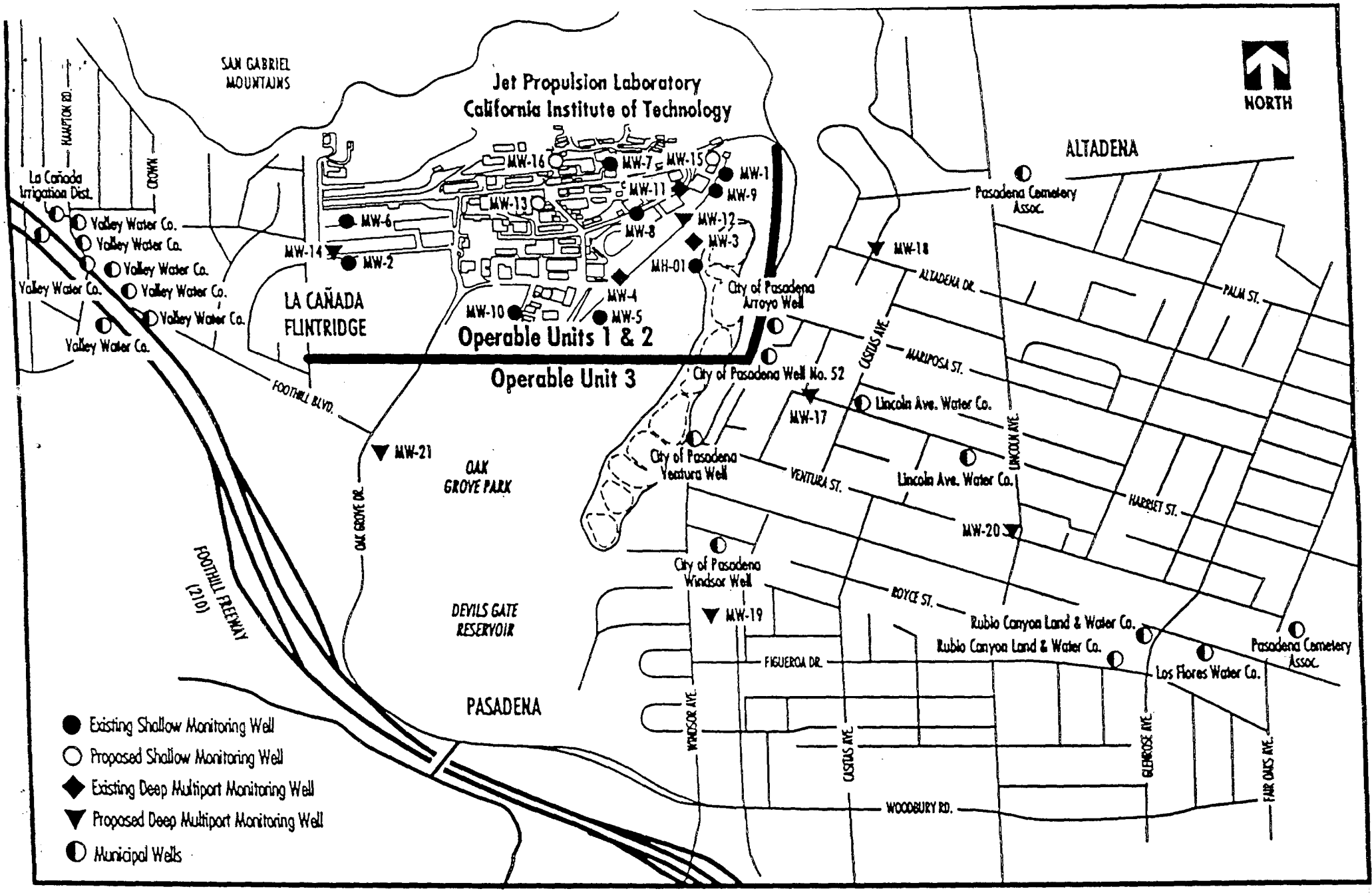
OPERABLE UNIT #3 APPROACH

- INSTALL FIVE (5) WELLS IN ALTADENA AND PASADENA
  - WELLS ARE CAPABLE OF MONITORING BOTH HORIZONTAL AND VERTICAL EXTENT OF CONTAMINATION
- SAMPLE ALL WELLS IN WET AND DRY SEASONS FOR CONTAMINANTS
  - VOCs AND OTHERS
- DEVELOP 3-D UNDERSTANDING OF CONTAMINANT DISTRIBUTION
  - SUPPLEMENT WITH COMPUTER MODELING
- EVALUATE ALTERNATIVES FOR REMEDIAL ACTIONS (IF ANY)



This map shows the general locations of monitoring and municipal wells at JPL and in the surrounding communities.

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JPL SUPERFUND PROJECT MAP

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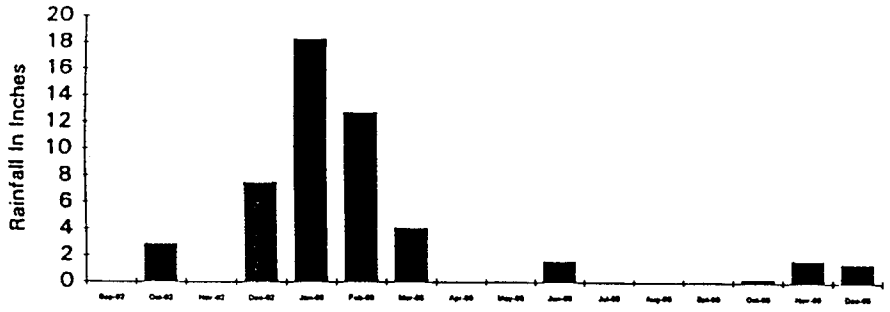
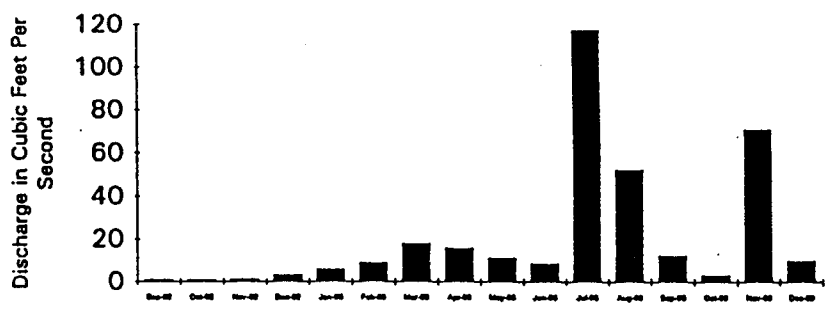
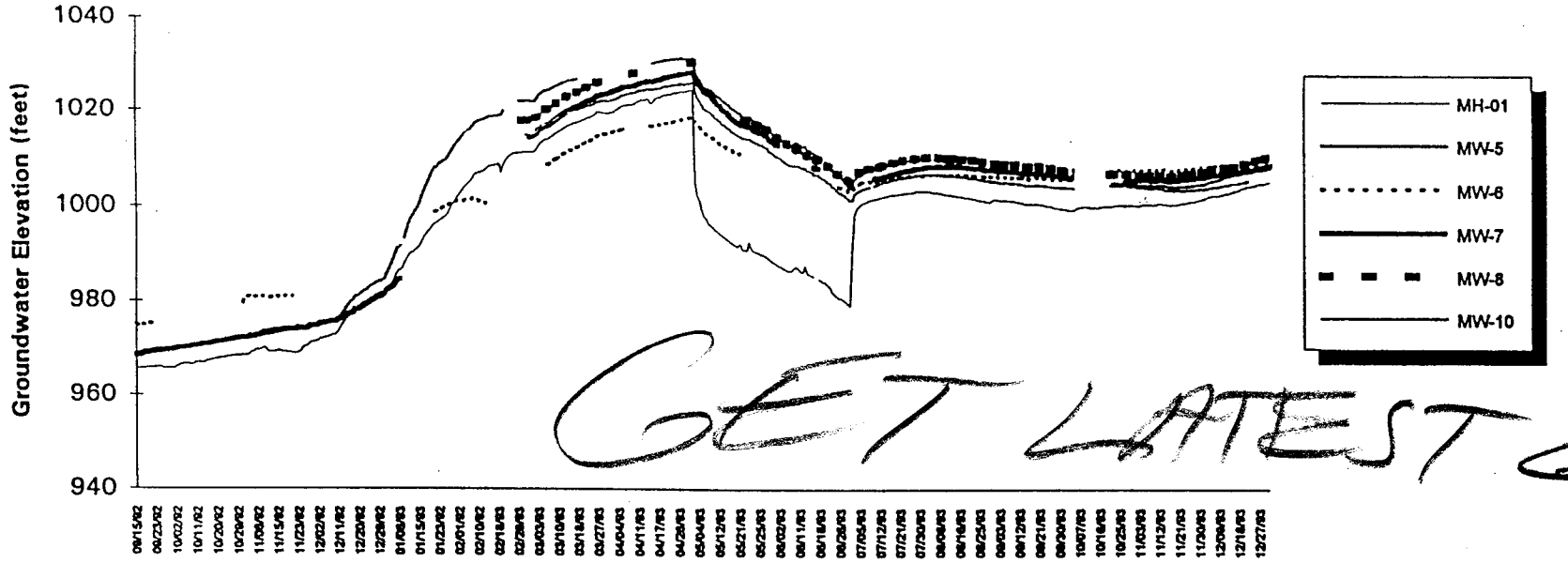
TECHNICAL INFORMATION AVAILABLE TO DATE AND INTERPRETATION







Previous Monitoring Period (September 1993-June 1993) Current Monitoring Period

Figure 4-1

Summary of Water-Level Data, Precipitation Data
and Spreading Ground Data
Between September 1992 and December 1993
For Wells MH-01, MW-5, MW-6, MW-7, MW-8, and MW-10

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CLB - 18
05/24/95

See Judy

Figure 4-1

FIGURE 6

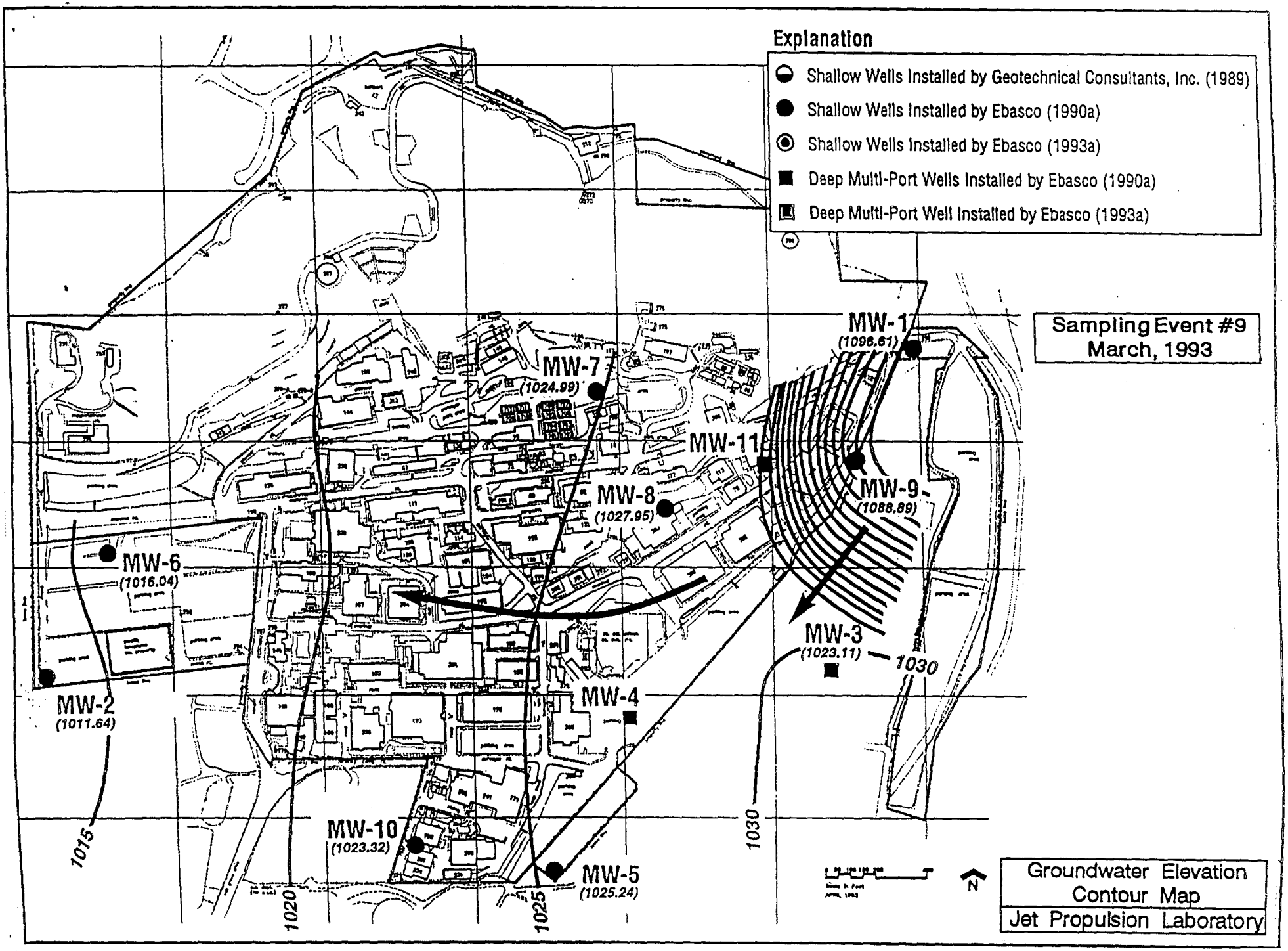
Explanation
Shallow Wells Installed by Geotechnical Consultants, Inc. (1989)
Shallow Wells Installed by Ebasco (1990a)
Shallow Wells Installed by Ebasco (1993a)
Deep Multi-Port Wells Installed by Ebasco (1990a)
Deep Multi-Port Well Installed by Ebasco (1993a)
Sampling Event #9
March, 1993
MW-1
(1096.61)
MW-7
(1024.99)
MW-11
MW-8
(1027.95)
MW-9
(1088.89)
MW-6
(1016.04)
MW-3
(1023.11)
MW-2
(1011.64)
MW-4
MW-10
(1023.32)
MW-5
(1025.24)
1015
1020
1025
1030
1030
N
Groundwater Elevation
Contour Map
Jet Propulsion Laboratory

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FIGURE 6

FIGURE 11

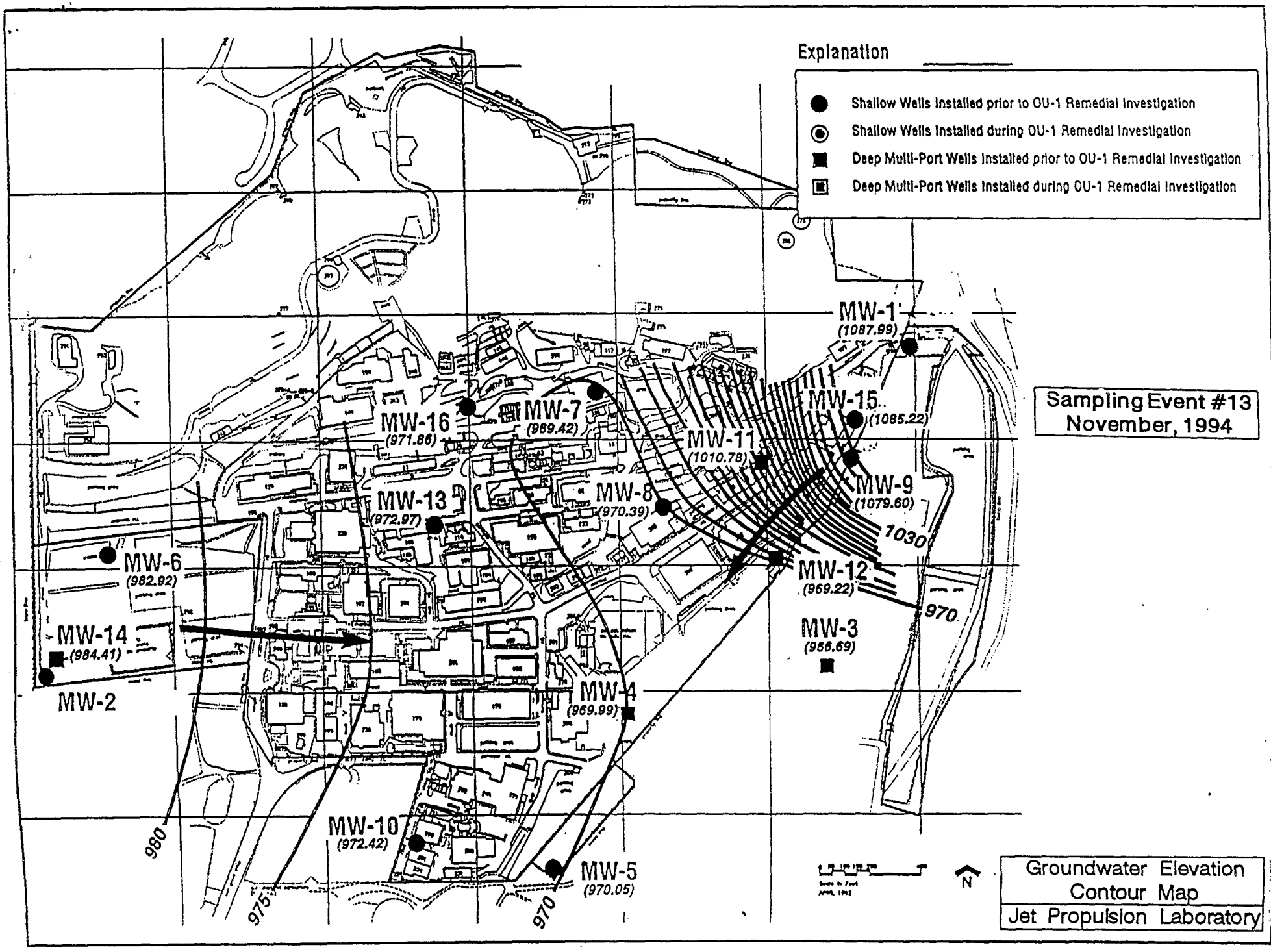
Explanation
Shallow Wells Installed prior to OU-1 Remedial Investigation
Shallow Wells Installed during OU-1 Remedial Investigation
Deep Multi-Port Wells Installed prior to OU-1 Remedial Investigation
Deep Multi-Port Wells Installed during OU-1 Remedial Investigation
Sampling Event #13
November, 1994
MW-1
(1087.99)
MW-15
(1085.22)
MW-11
(1010.78)
MW-9
(1079.60)
MW-16
(971.86)
MW-7
(969.42)
MW-13
(972.97)
MW-8
(970.39)
MW-6
(982.92)
MW-14
(984.41)
MW-2
MW-12
(969.22)
MW-3
(966.69)
MW-4
(969.99)
MW-10
(972.42)
MW-5
(970.05)
1030
970
980
975
970
N
Groundwater Elevation
Contour Map
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FIGURE 11

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SELECTED CONTAMINATION CONCENTRATION RESULTS

(in ppb)

	CARBON TET		TCE	
	JUN 94	NOV 94	JUN 94	NOV 94
MW-1	--	--	--	--
MW-3	--	--	--	--
MW-4	--	--	--	--
MW-5	--	--	--	--
MW-6	--	--	--	--
MW-7	180	310	33	30
MW-8	--	5.3	--	3.5
MW-9	--	--	--	--
MW-10	0.5	--	24	14
MW-11	0.6	--	--	--
MW-12	--	--	--	--
MW-13	15	71	70	48
MW-14	--	--	--	--
MW-15	--	--	--	--
MW-16	150	43	200	30

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OU-3 SAMPLE RESULTS (in ppb)

	MW-17	MW-18	MW-19	MW-20	MW-21
MCL*					
CCl_4	--*	--	0.6	--	--	0.5
TCE	--	--	--	--	29	5.0

*Notes:

MCL = Maximum Contaminant Level established by the regulatory agencies

-- = None Detected above MCL

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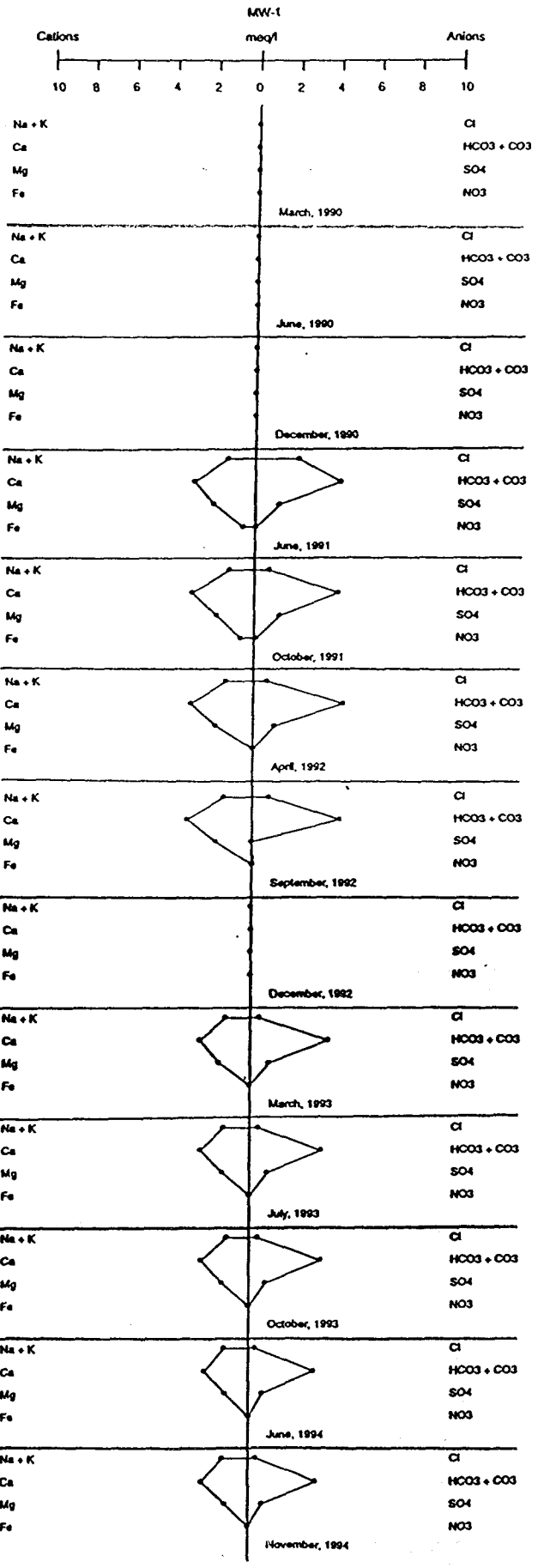
QUESTIONS ARISING FROM DATA AVAILABLE

- **TCE Distribution not consistent with other constituents**
  - **Needed Explanation**
- **Looked to Water Chemistry to see if water sources may be answer**

ALL CAPS

FIGURE 1



Stiff Diagrams
for
MW-1

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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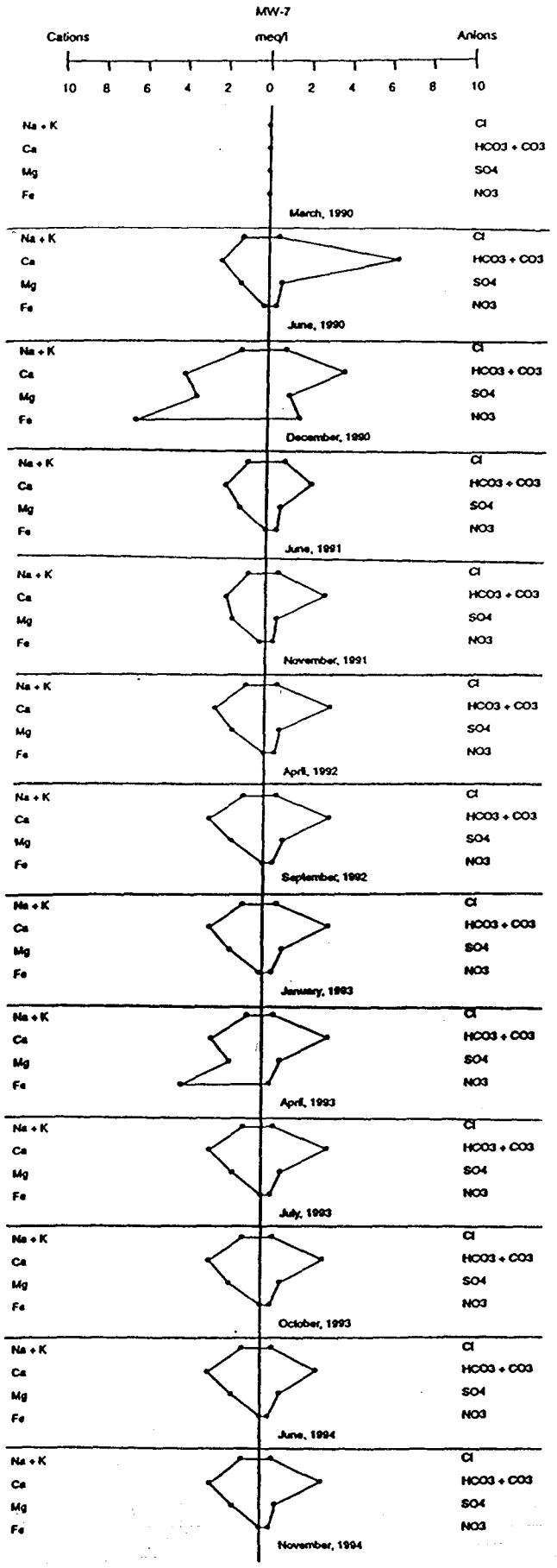
Figure 1 - Stiff Diagrams for MW-1

FIGURE 2



Stiff Diagrams
for
MW-7

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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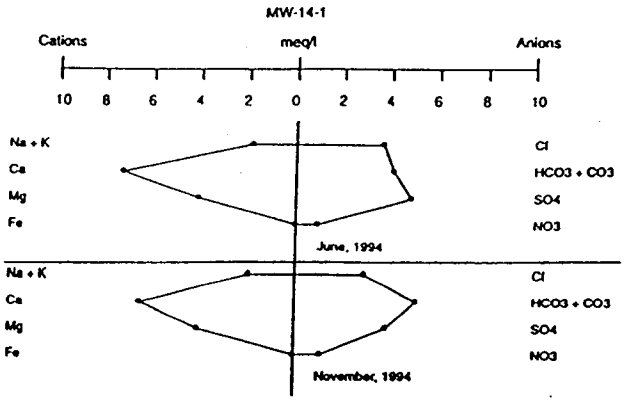
Figure 2 - Stiff Diagrams for MW-7

FIGURE 4



Stiff Diagrams
for
MW-14-1

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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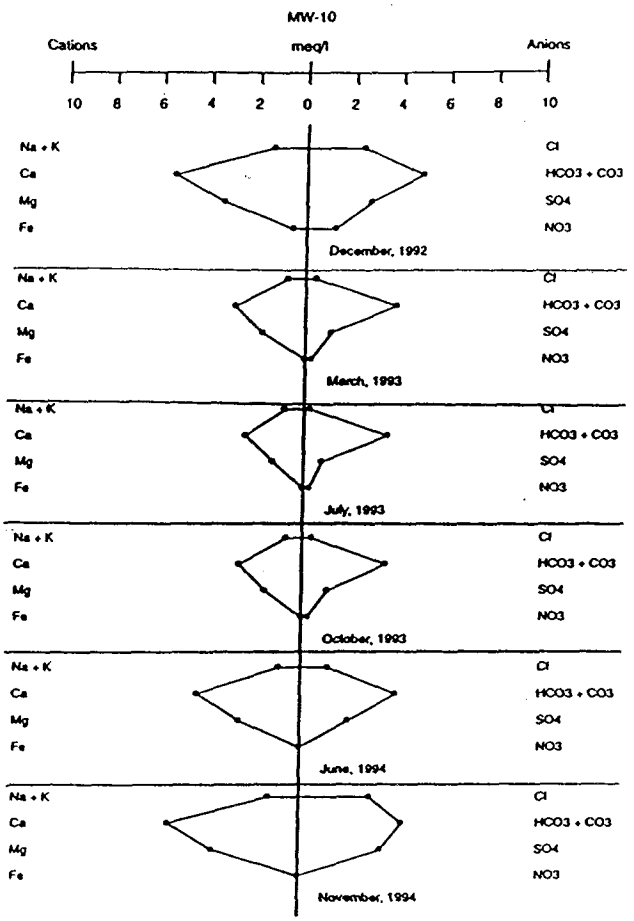
Figure 3 - Stiff Diagrams for MW-10

FIGURE 3



Stiff Diagrams
for
MW-10

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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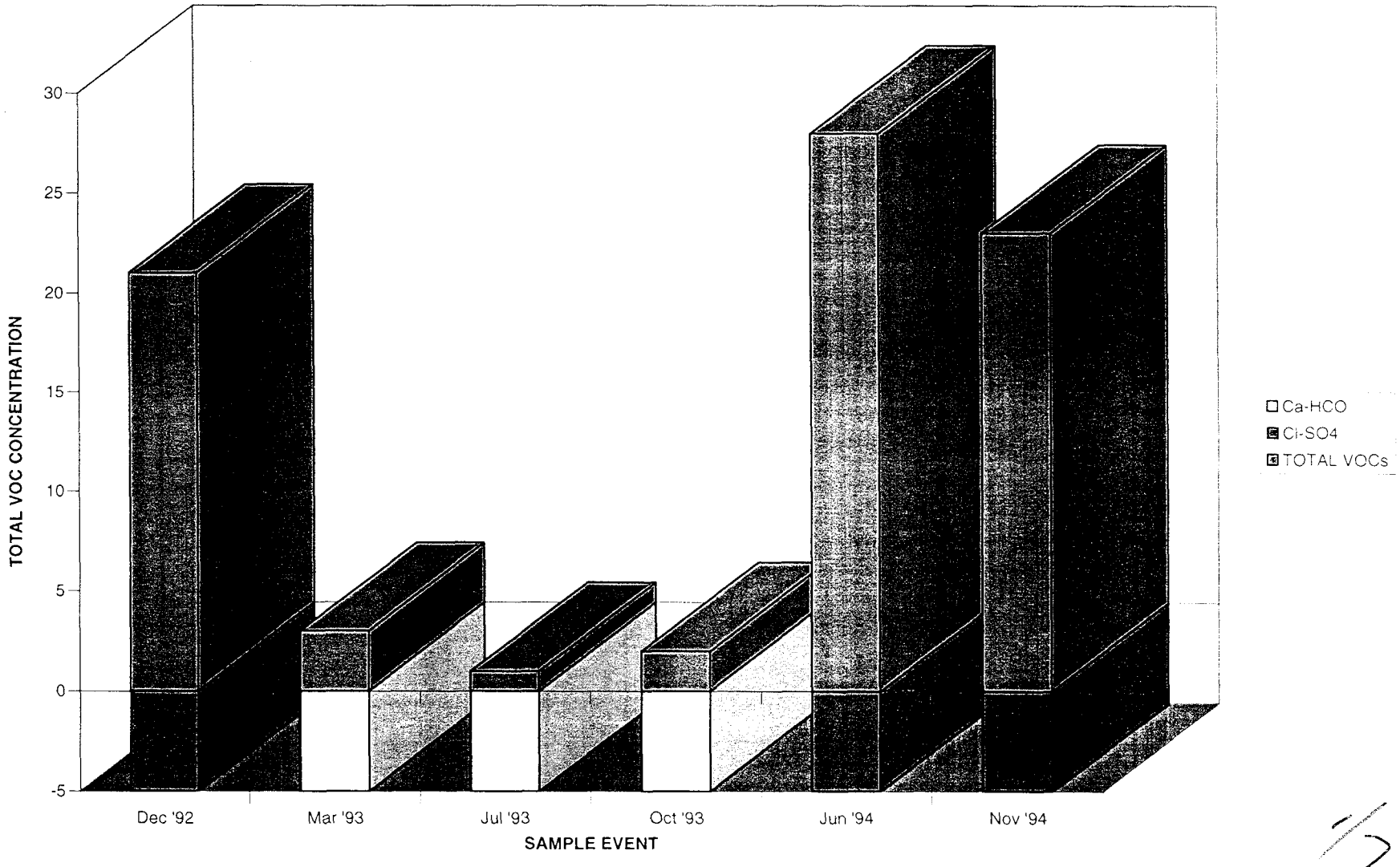
Figure 4 - Stiff Diagrams for MW-14-1

WATER TYPE AND VOC TOTAL CONCENTRATIONS



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WATER TYPE AND VOC TOTAL CONCENTRATIONS

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FUTURE ON-SITE INVESTIGATIVE EFFORTS

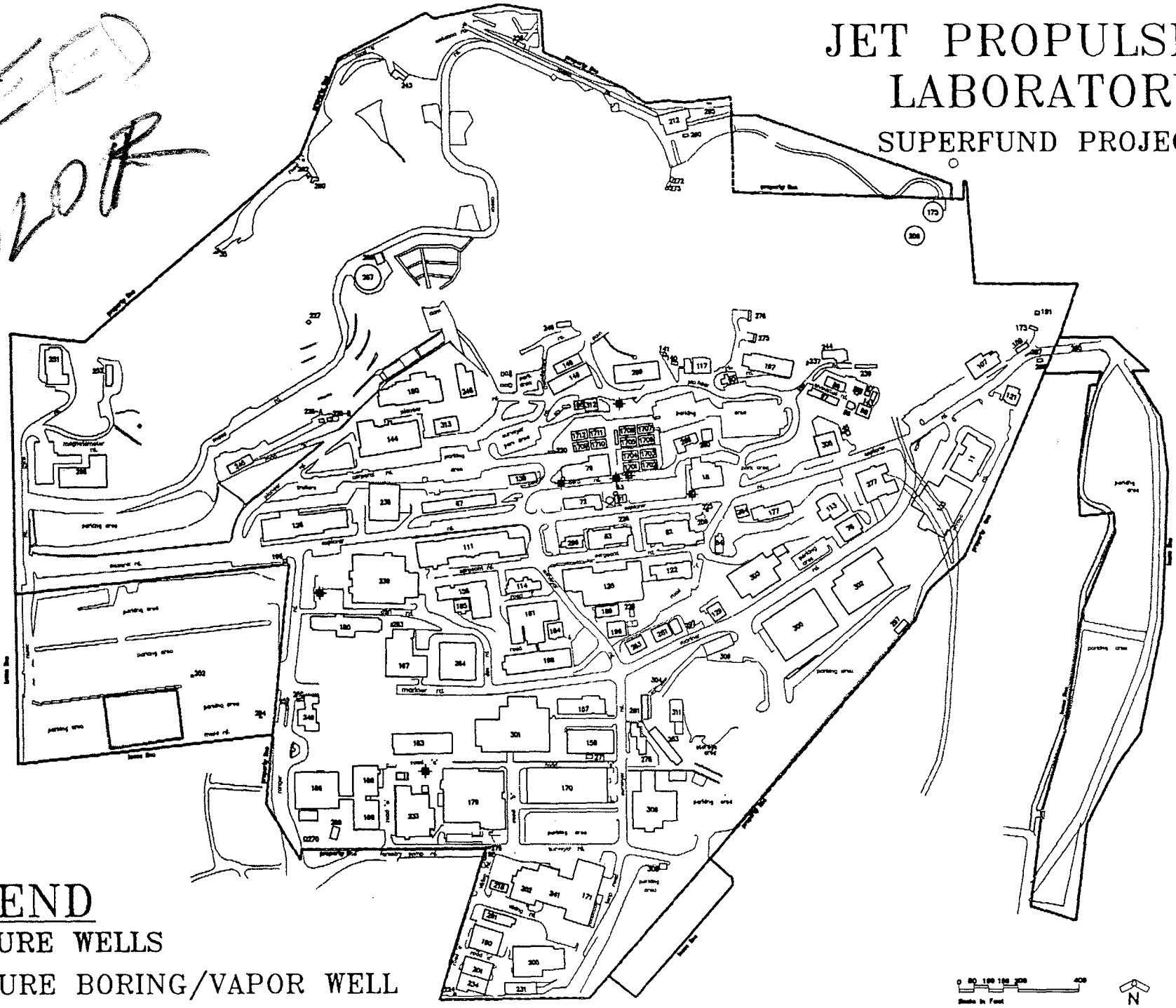
- 3 ADDITIONAL MULTIPORT WELLS
- 4 ADDITIONAL SOIL BORINGS / VAPOR WELLS
- LIMITED INVESTIGATION IN THE ARROYO SECO
- GROUNDWATER INVESTIGATION OF NORTHERN PORTION OF JPL
- OTHER SOIL VAPOR AND NON VOLATILE CONTAMINANTS (metals) WORK IN VARIOUS AREAS

* *CURRENTLY BEING DEBATED BETWEEN NASA AND THE REGULATORY AGENCIES*

NEED COLOR

JET PROPULSION LABORATORY

SUPERFUND PROJECT



LEGEND

- FUTURE WELLS
- FUTURE BORING/VAPOR WELL

AUGUST 14, 1990

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JPL SUPERFUND PROJECT MAP - Legend - Future wells & Boring /Vapor Well

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POTENTIAL REMEDIAL ACTIONS

OU-1: ON-SITE GROUNDWATER

- PUMP AND TREAT - MONITORING WELL SURVEILLANCE

- ISSUES OF POSSIBLE CONCERN
  - BASIN ADJUDICATION
  - IMPACT TO WATER PURVEYORS
  - DISPOSAL OF TREATED WATER

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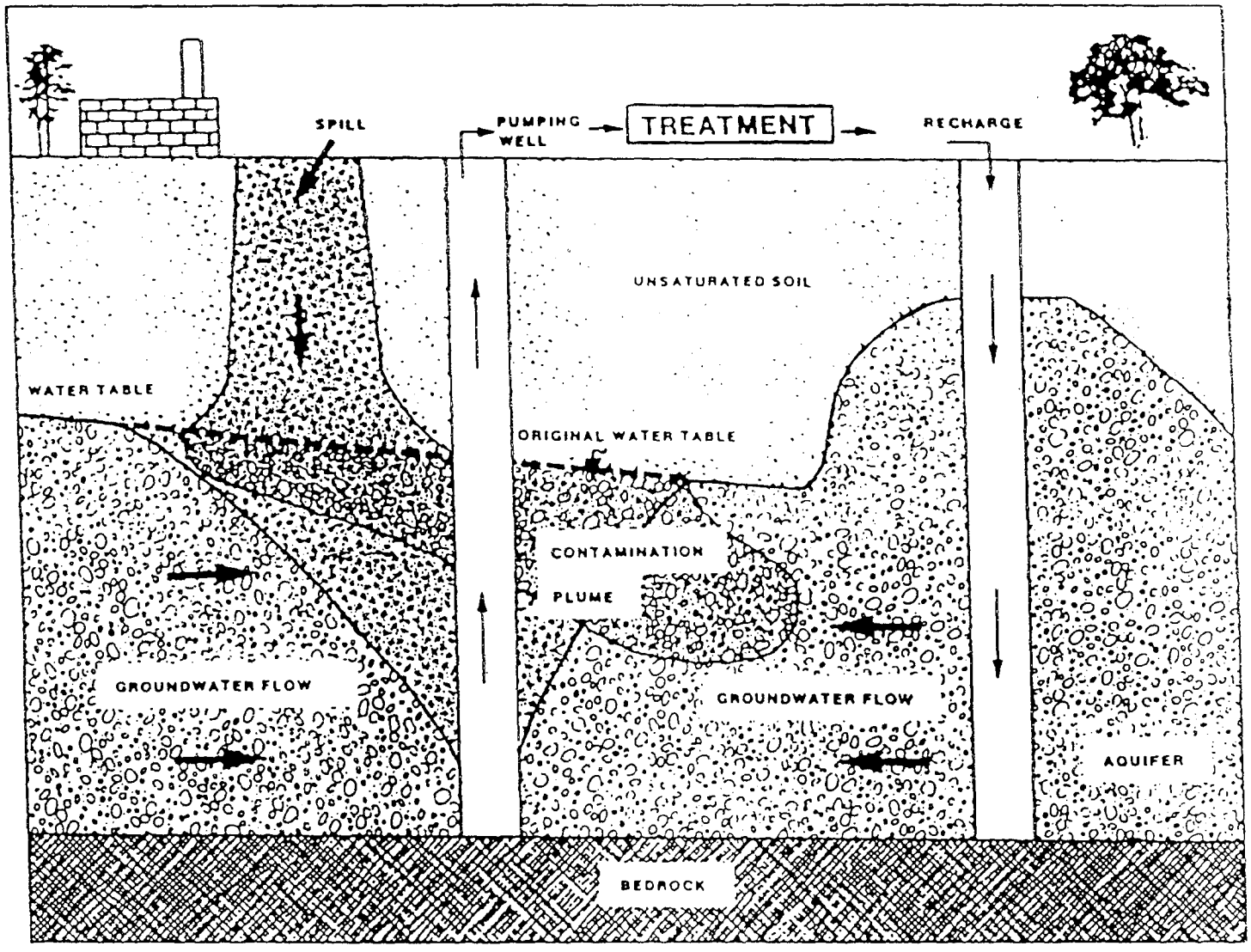
Groundwater Extraction, Treatment and Injection Scenario



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GROUNDWATER EXTRACTION, TREATMENT AND INJECTION SCENARIO

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POTENTIAL REMEDIAL ACTIONS
(CONTINUED)

OU-2: ON-SITE SOILS AND SOURCE AREAS

SOIL VAPOR EXTRACTION

- ASSUMES VAPOR EXTRACTION SYSTEM AT VARIOUS LOCATIONS. TWO MOBILE SYSTEMS UTILIZING THERMAL TREATMENT TO CLEAN CONTAMINANTS FROM THE AIR STREAM MAY BE ONE MEANS TO ACCOMPLISH CLEAN UP

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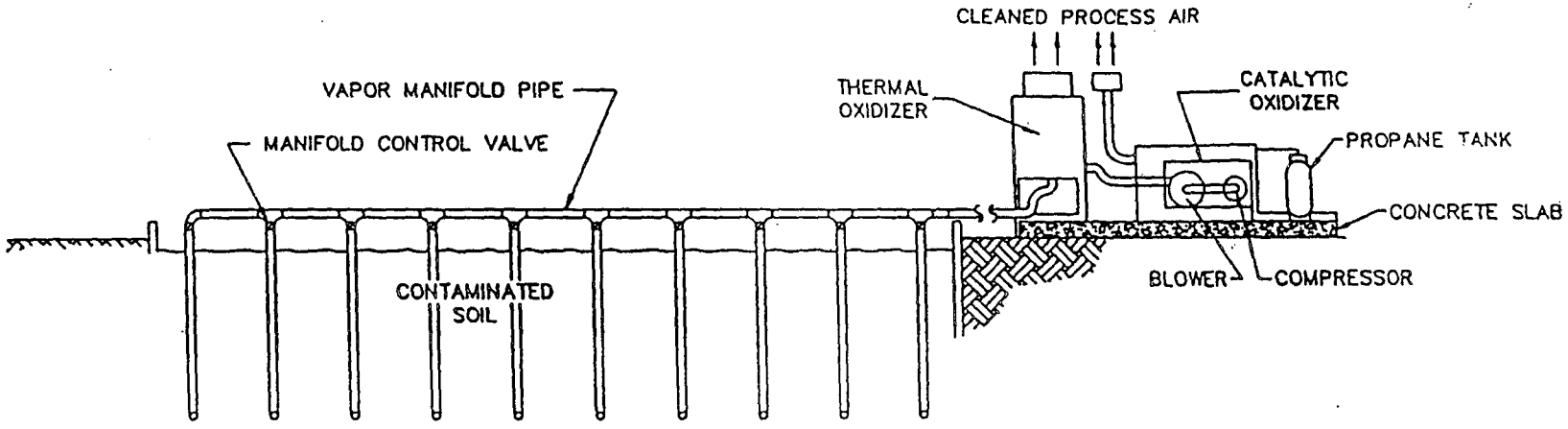
Front View of Vapor Extraction System Layout

53



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FRONT VIEW OF VAPOR EXTRACTION SYSTEM LAYOUT